Mass., in 1838. For many years this was not only a favorite exhibition plant but was also the parent of many "Indian Azaleas" like "Iveryana" and "Gledstanesii." Van Houtte's *Azalea indica punctulata* and *A. indica punctulata variegata*, which are figured in Flore des Serres XVI. tt. 1618–1621 (1865) and are possible hybrids between *R. indicum* Sweet and *R. Simsii* Planchon, are still in the Magnolia Gardens. So, too, is "Azalea Decora" which is probably of the same parentage and has rich red-colored flowers. This Azalea was introduced into Boston, Mass., by Marshall P. Wilder in 1848, and its descendants are still in the Holm Lea collection. The well-known *Azalea indica alba* or *A. ledifolia* (*R. mucronatum* G. Don) and its colored form (var. *ripense* Wils.) are of course represented at Magnolia by many fine bushes. This Azalea was introduced into Boston some time before 1838 and is quite hardy in gardens along the Hudson River, New York, and on Long Island where some very fine specimens are known. The largest and oldest specimen I know of, however, is in the garden of Mr. Henry F. Dupont, Winterthur, Delaware; this is 6 ft. 9 inches tall and 12 ft. 2 inches through the crown and has been in possession of the Dupont family since between 1835 and 1840.

NOTES FROM AUSTRALASIA. No. I

E. H. WILSON

AUSTRALIA is a new world to one familiar only with the flora of the northern Hemisphere. Everything is different, all the species, excepting certain aliens and naturalized weeds, most of the genera and many of the families. The remarkable Grass-tree (Kingia) and the Blackboy (Xanthorrhoea) of western Australia, probably of an earlier flora than any other living trees, seem out of place in the absence of pachydermatous animals, and wandering among them one half expects to meet an elephant, hippopotamus or rhinoceros whilst the presence of the extinct gigantic Saurians of the Jurassic Age would be in full keeping with these strange and ancient types of vegetation. Thanks to facilities freely placed at the disposal of the Arnold Arboretum's Expedition by the Government of Western Australia and to the admirable arrangements made by the Conservator of Forests, Mr. C. E. Lane-Poole, I traversed some 2000 miles in the southern part of Western Australia. Alone I should have been completely lost among the extraordinarily varied and anomalous vegetation but the Conservator himself was my guide through all the important forest areas and through the sand plains and savannah regions I had the companionship of the Government Botanist, Mr. D. A. Herbert. Thanks to the invaluable aid of these two men I was able to familiarize myself with all the more important trees and many of the larger shrubs of the regions traversed, and to appreciate in a small degree the enormous wealth of species. Truly the southern part of the vast country designated Western Australia is a veritable botanical garden

crammed with an astonishing variety of plants bearing a wealth of curious flowers of intense and vivid colours. Herbs are comparatively few in number though large areas are covered with the Swan River Daisy (*Brachycome iberidifolia* Benth.), Pink and Yellow Everlastings, (*Helipterum roseum* Benth. and *Waitzia aurea* Steetz), blue Dampieras, Stylidiums with flowers of every hue and tall growing Droseras of gigantic size when compared with their lowly relatives of the northern Hemisphere, whilst the curious Kangaroo-paws (Anigozanthus spp.) with orange, yellow, green and black flowers constantly call forth admiration. The shrubs and sub-shrubs when not in flower bear a strong resemblance to one another for most of them have narrow or spiny leaves, yet in blossom scarcely two companion bushes are alike. There are Grevilleas, Hakeas, Isopogons and others belonging to the family of Proteaceae, Callistemons, Beaufortias, Melaleucas, Boronias, all with gorgeous flowers, Acacias in great variety and innumerable others, but I must not omit Leschenaultia with flowers as blue as the heavens above. All the large trees are species of Eucalyptus and the smaller trees except a few peculiar to the coastal regions belong to the genera Casuarina, Agonis, Melaleuca, Banksia, Dryandra, Hakea, Callitris, Fusanus and Santalum — the last two are parasitic. Of climbing plants there are only three or four — Clematis, Kennedya and Hardenbergia being the chief — and all are slender vines. Most of the forests are open and park-like and except in the Karri forests of the southwest there is no thick or tall undergrowth, indeed, savannah-woodland well describes a large area of the forested land.

I did not visit the region north of Perth which is said to be unforested until the almost inaccessible northwest is reached, so what is here written has reference only to the country east and south of Fremantle. Proceeding from that seaport inland first comes a coastal area of sand-plain and low limestone hills on which and nestling on the banks of the Swan River Perth, the capital city, is situated. This coastal area abuts on the Darling fault, a low, well-defined range stretching from a point some 50 miles north of Perth some 200 miles southward and nowhere more than 800 ft. high. This range is of granite and gneiss and for the most part capped with ironstone laterite on which the Jarrah (*Eucalyptus marginata* Smith) luxuriates. The eastern flank of the Darling fault merges into an undulating plateau, granitic in character intercepted by belts of siliceous sands, which reaches its greatest elevation (1240 ft.) on the goldfields of Kalgoorlie, some 375 miles east from Perth. East from Kalgoorlie for 167 miles this granitic plateau descends until it dips below a limestone plain, well-named the Nullarbor Plain, which stretches eastward for 450 miles and though more or less well-clothed with shrubs (chiefly Acacias and Saltbush) is absolutely devoid of trees. In the southwest corner of Western Australia the country is broken in character, with more streams and a heavier rainfall, and there grow the tallest and finest trees. From the coast to the western edge of the Nullarbor Plain trees are plentiful and form forests even where the rainfall does not aver-

age more than five to eight inches annually. Truly the Eucalypts are extraordinary in many ways. They have highly specialized flowers which in many species are very large and of brilliant colors, they furnish most valuable hardwoods and grow to a lofty size in regions where one would suppose no tree could possibly exist. Take the Salmon Gum (*E. salmonophloia* F. v. Muell.). On the Goldfields area where the rainfall varies from 5 to 10 inches this tree grows a hundred feet tall with a clean, polished trunk full ten feet in girth. With numerous other species of rather less size it is the dominant tree in rather open forests which cover many hundreds of square miles and furnishes timber, the second strongest in Australia, and invaluable for mining purposes. Indeed but for this tree and the Gimlet (*E. salubris* F. v. Muell) it is questionable if the goldfields of Western Australia, which have to date yielded upwards of four hundred million dollars worth of gold, could have been developed. Another anomalous thing about this tree is that, like all other Eucalypts of Western Australia, it is surface-rooting! A degree or two of frost is not unknown in the region where it grows and I am told that it is flourishing in parts of South Africa. I cannot help thinking that this tree would be a good subject to plant for forestry purposes in the hot, arid parts of Lower California, Texas, New Mexico and of Arizona. Of course the Salmon Gum like all other plant of this Hemisphere are useless in the Arnold Arboretum but they would be of immense value to California. We of the north know little about the Eucalytus and to us the Blue Gum (*E. globulus* Labill.) and one or two others do duty for the whole genus. We know that they are mighty trees which furnish valuable timber but I doubt if many of us realize the ornamental character and great beauty of the flowers of a number of the species. The scarlet-flowered *E. ficifolia* F. v. Muell., which is found wild only on a very limited area near the sea in the southwest of Western Australia, must rank among the most beautiful of trees. It is of small size, quick-growing, has large leaves and terminal masses of flowers from pale orange to crimson in color. The red-flowered *E. torquata* Luehm. is another small tree and this has axillary clusters of flowers which vary in color from white to scarlet. About *E. macrocarpa* Hook. I may add here that the flowers are often 7 inches across!

The wood of the Jarrah (*E. marginata* Smith) is well-known through its use as street-paving blocks and for railway ties. Useful as it is for these purposes it is altogether wrong that so valuable a wood should be so basely employed. The proper use of Jarrah-wood is for making furniture. The tallest and most beautiful of the Western Australian species is the Karri (*E. diversicolor* F. v. Muell.). Trees little short of 300 feet tall with a trunk clean of branches for fully 150 feet are common. Considering the height of this tree the trunk is comparatively slender, seldom exceeding 30 feet but it tapers very gradually. The bark is white and marbled and the trunks suggest columns of some mighty cathedral. Ranking second in height is the Red Tingle (*E. Jacksonii*), another handsome

tree confined to a limited area near the sea in the southwest and only rather recently recognized. The Tuart (*E. gomphocephala* D. C.) grows only on the coastal limestone and a number of others are more or less confined to special soils. A very good account of the Eucalypts of Western Australia is given by Lane-Poole in his "Statement prepared for the British Empire Forestry Conference" (1920).

Of the lesser trees of Western Australia the Peppermint (*Agonis flexuosa* Lindl.) grows to the largest size and in one district forms pure undergrowth in prime Tuart forest. The Peppermint has a dark, fibrous and fissured bark and slender willow-like branches with axillary white flowers. Another species (*A. juniperina* Schauer) furnishes valuable timber but is a smaller and less handsome tree. The Casuarinas, of which there are a number of species, are common trees of no great size found on the sand-plains and in the Eucalyptus-forests. In the swamps and along the sides of streams several species of Melaleuca grow and since they have a white thin bark which peels off readily are known as Paper-bark trees. Most striking are the Banksias with their terminal erect, cone-like inflorescence. The most common species are *Banksia grandis* Willd. and *B. littoralis* R. Br., both with yellow flowers, but more valuable is *B. verticillata* R. Br. with exquisitely figured wood. These Banksias ought to be cultivated in California. Common on the Wheat-belt is *Acacia acuminata* Benth., a small tree with a neat rounded or oval crown of slender branches and wood of exactly the odour of Raspberry Jam.

The Blackboys (*Xanthorrhoea Preissii* Endl. and *X. reflexa*) and the Grass-tree (*Kingia australis* R. Br.) are extraordinarily abundant on the coastal plains and in the open forests from Perth southward. The first-named have a solitary erect rod-like inflorescence sometimes six feet, whereas in the Grass-tree the inflorescence is a small, drumstick-like affair arranged several together in the form of a necklet. Very widely spread in Western Australia is the Sandal-wood (*Santalum cygnorum* Miq.). This is a small, rather ugly, parasitic tree with fragrant wood in great demand in China to burn as incense. There are many other trees worthy of note but I conclude with the mention of another parasite, *Nuytsia floribunda* R. Br., the so-called Christmas-tree of Western Australia. This remarkable tree belongs to the Loranthaceae and possesses a whole catalogue of pecularities. It grows from 25 to 40 feet tall with a trunk from 5 to 8 feet in girth and an irregular crown of green branches and branchlets. The wood is very brittle and when not in flower it is an ugly tree. It is common on the sand-plains round Perth and elsewhere and toward the end of November and in December every branch terminates in a large panicle of rich orange-colored flowers. When I left Perth a week ago many of these trees were in full flower and wonderfully beautiful.